

Application Serial No. 10/648,869
Reply to June 30, 2005 Office Action

-2-

Docket No. 1232-5126

AMENDMENTS TO THE CLAIMS

Please cancel claims 1, 9, and 17 without prejudice or disclaimer. Please amend claims 2, 3, 4, 7, 8, 10, 11, 15, 16, and 18 as follows: This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims

1. (canceled)
2. (currently amended) A recording apparatus as defined in claim 1, wherein: which performs recording on a recording medium while repeating a main scanning operation of record-scanning with a recording head having a plurality of recording elements arrayed in a predetermined direction, in a main scanning direction substantially orthogonal to the predetermined direction, and a sub scanning operation of relatively moving the recording head and the recording medium in a sub scanning direction orthogonal to the main scanning direction, comprising:
shift means capable of shifting, by a magnitude corresponding to a designated number of the recording elements, recording data stored in a buffer memory, and then transferring the recording data to said recording head; and
control means for controlling said shift means so that, in a case where a region which cannot be record-scanned by said recording head exists in a region near an end part of said recording medium in the sub scanning direction, and where a relative position of said recording head and said recording medium in said sub scanning direction cannot be renewed, said recording data to be transferred to said

Application Serial No. 10/648,869
Reply to June 30, 2005 Office Action

-3-

Docket No. 1232-5126

recording head may be shifted by said shift means onto a side of the region which cannot be record-scanned in said sub scanning direction, wherein:
in a case where the recording is performed by relatively moving said recording medium every stipulated movement amount n in said sub scanning direction each time the record-scanning is performed in the main scanning direction by said recording head whose recording elements number N , and where said recording can be started only from a position which is shifted by a heading amount X from a front end of said recording medium in said sub scanning direction, said control means controls said shift means;
so that, in a case where an accumulative value obtained by accumulating the stipulated movement amount n from zero every record-scanning is less than the heading amount X and where a difference between said heading amount X and the accumulative value is not less than said stipulated movement amount n , such record-scannings may be repeated by shifting said recording data onto a side of the region which cannot be record-scanned in said sub scanning direction in correspondence with the difference between said heading amount X and said accumulative value by said shift means, without relatively moving said recording medium;
that, in a case where said accumulative value is less than said heading amount X and where said difference between said heading amount X and said accumulative value is less than said stipulated movement amount n , said recording medium may be relatively moved in correspondence with said

935543 v1

Application Serial No. 10/648,869
Reply to June 30, 2005 Office Action

-4-

Docket No. 1232-5126

difference between said heading amount X and said accumulative value after
said record-scanning; and

that the record-scannings may be thereafter repeated by relatively moving said
recording medium every stipulated movement amount n in said sub scanning
direction, without shifting said recording data by said shift means.

3. **(currently amended)** A recording apparatus as defined in claim [[1]] 2, wherein:
after said recording medium has become incapable of [[the]] a relative movement of
said stipulated movement amount n at a rear end of said recording medium in said
sub scanning direction, said control means controls said shift means;
so that, before a difference between an accumulative value obtained by accumulating
a stipulated movement amount n from zero every record-scanning from a head of
said recording medium and a movement execution amount from the head of said
recording medium exceeds the number N of the recording elements of said
recording head, such record-scannings may be repeated by shifting said recording
data onto a side of the region which cannot be record-scanned in said sub
scanning direction in correspondence with the difference between the
accumulative value and the movement execution amount by said shift means.

4. **(currently amended)** A recording apparatus, comprising:
record means for performing recording on a recording medium while repeating a
main scanning operation of record-scanning with a recording head having a
plurality of recording elements arrayed in a predetermined direction, in a main

Application Serial No. 10/648,869
Reply to June 30, 2005 Office Action

-5-

Docket No. 1232-5126

scanning direction substantially orthogonal to said predetermined direction, and a sub scanning operation of moving the recording medium in a sub scanning direction orthogonal to the main scanning direction;

a first paper feed port into which said recording medium is set from an upper stream side in a conveyance direction of said recording medium in a recording mode, so as to perform an edge positioning operation by conveying said recording medium in a direction the same as the conveyance direction in the recording mode;

a second paper feed port into which said recording medium is set from a lower stream side in said conveyance direction of said recording medium in said recording mode, so as to perform an edge positioning operation by conveying said recording medium in a direction reverse to said conveyance direction of said recording medium in said recording mode; and

control means for performing a control in case of performing the edge positioning operation by setting said recording medium into said second paper feed port, so that, in a region which lies in a region near an end part of said recording medium on the lower stream side in said conveyance direction in said recording mode and which cannot be record-scanned by said recording head, recording data may be shifted onto a side of the region which cannot be record-scanned in the sub scanning direction and may be then transferred to said recording head.

5. (original) A recording apparatus which performs recording on a recording medium while repeating a main scanning operation of record-scanning with a recording head having N recording elements, in a main scanning direction, and a sub scanning operation

935543 v1

Application Serial No. 10/648,869
Reply to June 30, 2005 Office Action

-6-

Docket No. 1232-5126

of relatively moving the recording head and the recording medium every stipulated movement amount n in a sub scanning direction orthogonal to the main scanning direction, comprising:

a first counter which stores therein a relative movement amount from a head of said recording medium;

a second counter which stores therein a logical recording position from the head of said recording medium;

shift means capable of shifting, by a magnitude corresponding to a designated number of the recording elements, a recording pattern stored in a buffer memory, and then transferring the recording pattern to said recording head; and

control means for controlling the relative movement of said recording medium, the record-scanning of said recording head, counts of the first and second counters, and the shift in said shift means;

wherein said control means performs the control: so that, at start of recording for said recording medium, the recording may be started upon relatively moving said recording medium to a position which is shifted onto a lower stream side in a moving direction, by a heading amount X from top edge of said medium, and setting said first counter and said second counter at X and "0", respectively;

that, at every record-scanning, in a case where values of said first counter and said second counter are equal, a regular recording may be performed, and in a case where the values are not equal, the record-scanning may be performed by shifting the recording data onto the lower stream side in the moving direction, in

Application Serial No. 10/648,869
Reply to June 30, 2005 Office Action

-7-

Docket No. 1232-5126

correspondence with a difference d between the values of the first and second counters by said shift means; and that, after the record-scanning, in a case where the difference d is less than the stipulated movement amount n , $(n-d)$ may be added to the value of said first counter by moving said recording medium by $(n-d)$ in the sub scanning direction, that, in a case where said difference d is not less than said stipulated movement amount n , the movement control may be performed so as not to perform the relative movement operation of said recording medium in said sub scanning direction, and that said second counter may add up the stipulated movement amounts n irrespective of existence or nonexistence or a movement amount of said movement operation of said recording medium.

6. **(original)** A recording apparatus as defined in claim 5, wherein said control means performs said control so as not to perform said record-scanning in the processing of every record-scanning, in a case where said difference d between said values of said first counter and said second counter is not less than the number N of said recording elements of said recording head.
7. **(currently amended)** A recording apparatus as defined in claim 5, further comprising a first paper feed port into which said recording medium is set from an upper stream side in a conveyance direction of said recording medium in a recording mode, so as to perform an edge positioning operation by conveying said recording medium in a direction the same as the conveyance direction in the recording mode, and a second paper feed port

Application Serial No. 10/648,869
Reply to June 30, 2005 Office Action

-8-

Docket No. 1232-5126

into which said recording medium is set from a lower stream side in said conveyance direction of said recording medium in said recording mode, so as to perform an edge positioning operation by conveying said recording medium in a reverse direction to said conveyance direction of said recording medium in said recording mode;

wherein the heading amount X differs depending upon the sort of the paper feed port
to be used that is used.

8. **(currently amended)** A recording apparatus as defined in claim 2, wherein said heading amount X differs in accordance with a size of the recording medium to be used that is used.
9. **(canceled)**
10. **(original)** A method of controlling a recording apparatus as defined in claim 9, wherein:
which performs recording on a recording medium while repeating a main scanning
operation of record-scanning a recording head having a plurality of recording elements
arrayed in a predetermined direction, in a main scanning direction substantially
orthogonal to the predetermined direction, and a sub scanning operation of relatively
moving the recording head and the recording medium in a sub scanning direction
orthogonal to the main scanning direction, comprising a control step including the step
of:
shifting recording data onto a side of a region which cannot be record-scanned in the
sub scanning direction, by a magnitude corresponding to a designated number of

935543 v1

Application Serial No. 10/648,869
Reply to June 30, 2005 Office Action

-9-

Docket No. 1232-5126

the recording elements, and then transferring the recording data to the recording head, in a case where the region which cannot be record-scanned by said recording head exists in a region near an end part of the recording medium in said sub scanning direction, and where a relative position of said recording head and said recording medium in said sub scanning direction cannot be renewed,
wherein:

in a case where the recording is performed by relatively moving said recording medium every stipulated movement amount n in said sub scanning direction each time the record-scanning is performed in the main scanning direction by said recording head whose recording elements number N , and where the print recording can be started only from a position which is shifted by a heading amount X from a front end of said recording medium in said sub scanning direction, said control step proceeds;

so that, in a case where an accumulative value obtained by accumulating the stipulated movement amount n from zero every record-scanning is less than the heading amount X and where a difference between said heading amount X and the accumulative value is not less than said stipulated movement amount n , such record-scannings may be repeated by shifting said recording data onto a side of the region which cannot be record-scanned in said sub scanning direction in correspondence with the difference between said heading amount X and said accumulative value by said shift means, without relatively moving said recording medium;

Application Serial No. 10/648,869
Reply to June 30, 2005 Office Action

-10-

Docket No. 1232-5126

that, in a case where said accumulative value is less than said heading amount X and where said difference between said heading amount X and said accumulative value is less than said stipulated movement amount n, said recording medium may be relatively moved in correspondence with said difference between said heading amount X and said accumulative value after said record-scanning; and

that the record-scannings may be thereafter repeated by relatively moving said recording medium every stipulated movement amount n in said sub scanning direction, without shifting said recording data by said shift means.

11. (currently amended) A method of controlling a recording apparatus as defined in claim [[9]] 10, wherein:

after said recording medium has become incapable of the relative movement of said stipulated movement amount n at a rear end of said recording medium in said sub scanning direction, said control step proceeds;

so that, before a difference between an accumulative value obtained by accumulating a stipulated movement amount n from zero every record-scanning from a head of said recording medium and a movement execution amount from the head of said recording medium exceeds the number N of the recording elements of said recording head, such record-scannings may be repeated by shifting said recording data onto a side of the region which cannot be record-scanned in said sub scanning direction in correspondence with the difference between the accumulative value and the movement execution amount by said shift means.

Application Serial No. 10/648,869
Reply to June 30, 2005 Office Action

-11-

Docket No. 1232-5126

12. (original) A method of controlling a recording apparatus, having:

a first paper feed port into which a recording medium is set from an upper stream side in a conveyance direction of the recording medium in a recording mode, so as to perform an edge positioning operation by conveying said recording medium in a direction the same as the conveyance direction in the recording mode;

a second paper feed port into which said recording medium is set from a lower stream side in said conveyance direction of said recording medium in said recording mode, so as to perform an edge positioning operation by conveying said recording medium in a direction reverse to said conveyance direction of said recording medium in said recording mode; and

recording means for performing recording on said recording medium while repeating a main scanning operation of record-scanning a recording head having a plurality of recording elements arrayed in a predetermined direction, in a main scanning direction substantially orthogonal to said predetermined direction, and a sub scanning operation of moving said recording medium in a sub scanning direction orthogonal to the main scanning direction; comprising the step of:

performing a control in case of performing the edge positioning operation by setting said recording medium into said second paper feed port, so that, in a region which lies in a region near an end part of said recording medium on the lower stream side in said conveyance direction in said recording mode and which cannot be record-scanned by the recording head, recording data may be

Application Serial No. 10/648,869
Reply to June 30, 2005 Office Action

-12-

Docket No. 1232-5126

shifted onto a side of the region which cannot be record-scanned in the sub scanning direction and may be then transferred to said recording head.

13. (original) A method of controlling a recording apparatus which performs recording on a recording medium while repeating a main scanning operation of record-scanning with a recording head having N recording elements, in a main scanning direction, and a sub scanning operation of relatively moving the recording head and the recording medium every stipulated movement amount n in a sub scanning direction orthogonal to the main scanning direction, and which has:

a first counter which stores therein a relative movement amount from a head of said recording medium;

a second counter which stores therein a logical recording position from the head of said recording medium; and

shift means capable of shifting, by a magnitude corresponding to a designated number of the recording elements, a recording pattern stored in a buffer memory, and then transferring the recording pattern to said recording head; comprising:

the control step of controlling the relative movement of said recording medium, the record-scanning of said recording head, counts of the first and second counters, and the shift in said shift means;

wherein said control step performs the control: so that,

at start of recording for said recording medium, the recording may be started upon relatively moving said recording medium to a position which is shifted onto a lower stream side in a moving direction, by a heading amount X from top

935543 v1

Application Serial No. 10/648,869
Reply to June 30, 2005 Office Action

-13-

Docket No. 1232-5126

edge of said medium, and setting said first counter and said second counter at X and "0", respectively;

that, at every record-scanning, in a case where values of said first counter and said second counter are equal, a regular recording may be performed, and in a case where the values are not equal, the record-scanning may be performed by shifting the recording data onto the lower stream side in the moving direction, in correspondence with a difference d between the values of the first and second counters by said shift means; and

that, after the record-scanning, in a case where the difference d is less than the stipulated movement amount n , $(n-d)$ may be added to the value of said first counter by moving said recording medium by $(n-d)$ in the sub scanning direction, that, in a case where said difference d is not less than said stipulated movement amount n , the movement control may be performed so as not to perform the relative movement operation of said recording medium in said sub scanning direction, and that said second counter may add up the stipulated movement amounts n irrespective of existence or nonexistence or a movement amount of said movement operation of said recording medium.

14. (original) A method of controlling a recording apparatus as defined in claim 13, wherein said control step performs said control so as not to perform said record-scanning in the processing of every record-scanning, in a case where said difference d between said values of said first counter and said second counter is not less than the number N of said recording elements of said recording head.

Application Serial No. 10/648,869
Reply to June 30, 2005 Office Action

-14-

Docket No. 1232-5126

15. (currently amended) A method of controlling a recording apparatus as defined in claim 11, wherein the recording apparatus further has a first paper feed port into which said recording medium is set from an upper stream side in a conveyance direction of said recording medium in a recording mode, so as to perform an edge positioning operation by conveying said recording medium in a direction the same as the conveyance direction in the recording mode, and a second paper feed port into which said recording medium is set from a lower stream side in said conveyance direction of said recording medium in said recording mode, so as to perform an edge positioning operation by conveying said recording medium in a reverse direction to said conveyance direction of said recording medium in the print recording mode; and

wherein [[the]] a heading amount X differs depending upon the sort of the paper feed port ~~to-be-used~~ that is used, at said control step.

16. (currently amended) A method of controlling a recording apparatus as defined in claim 10, wherein said heading amount X differs in accordance with a size of the recording medium ~~to-be-used~~ that is used, at said control step.

17. (canceled)

18. (currently amended) A storage medium in which a control program that executes the method defined in claim 10 as defined in claim 17 is stored in a computer-readable manner.

935543 v1